



CHARA Remote Operations and Data Access

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The CHARA Server

- Located at GSU Data Center
- 5 Virtual Machines:
 - Remote Observing
 - altair & novadel
 - Data Archive
 - Remote Data Reduction
 - Database Portal



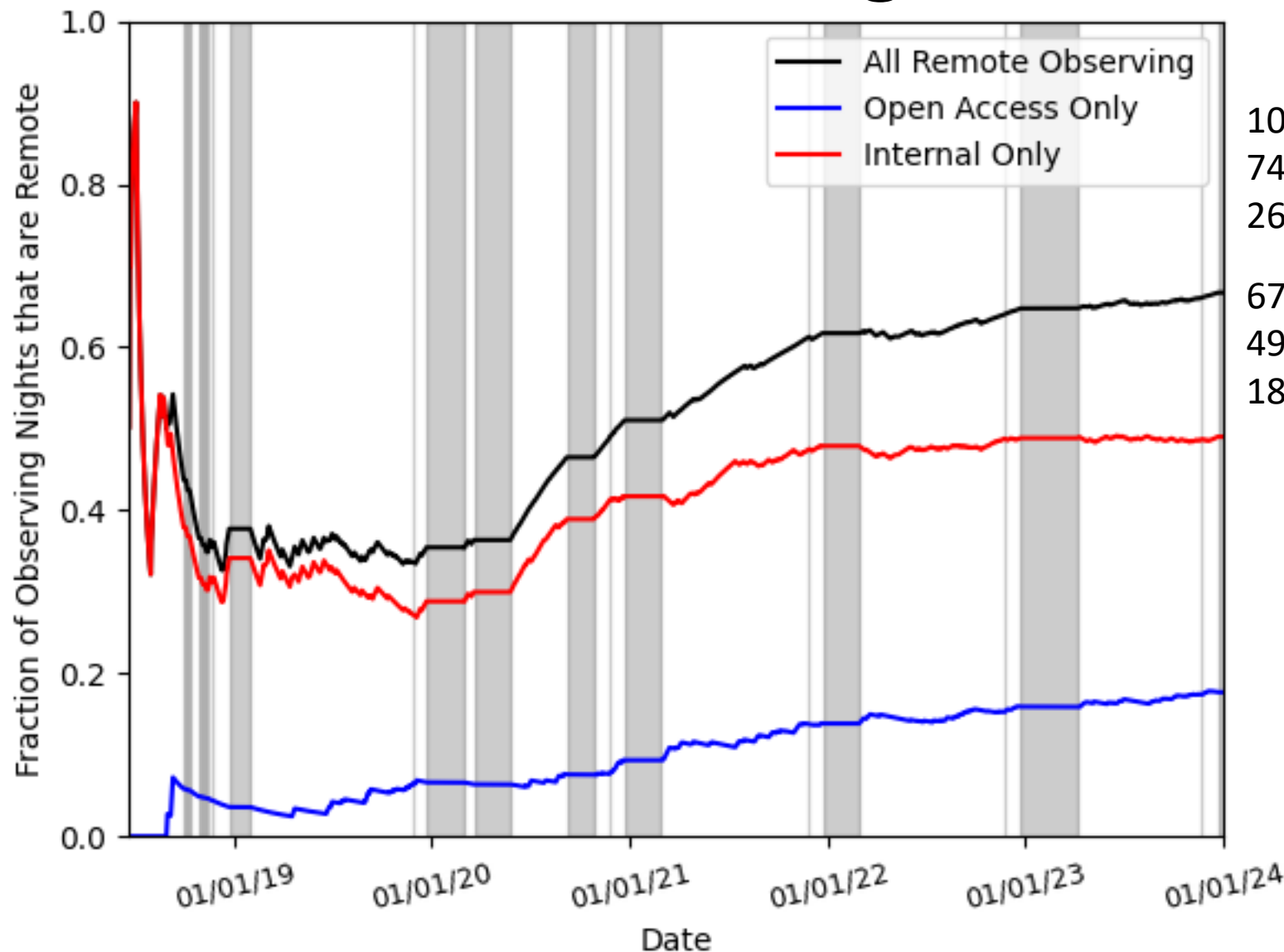
Remote Observing

- Connect to Atlanta machine using VNC
- Atlanta machine connects to mountain using SSH tunnel
- CHARA software is the same as that on the mountain





Remote Observing Stats

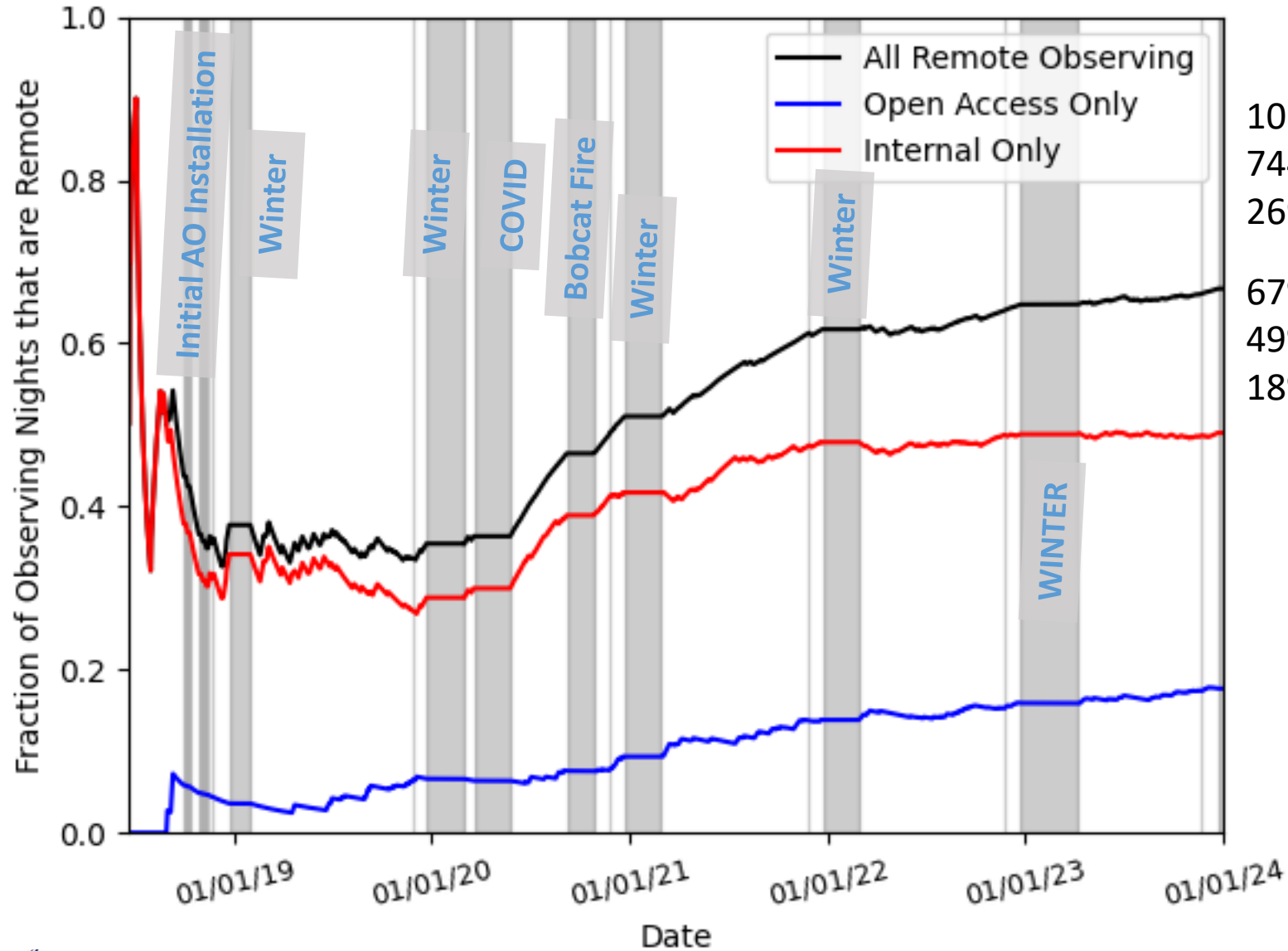


1013 Remote Nights
744 Internal
269 Open Access

67% Remote Nights
49% Internal+Remote
18% Open Access+Remote



Remote Observing Stats

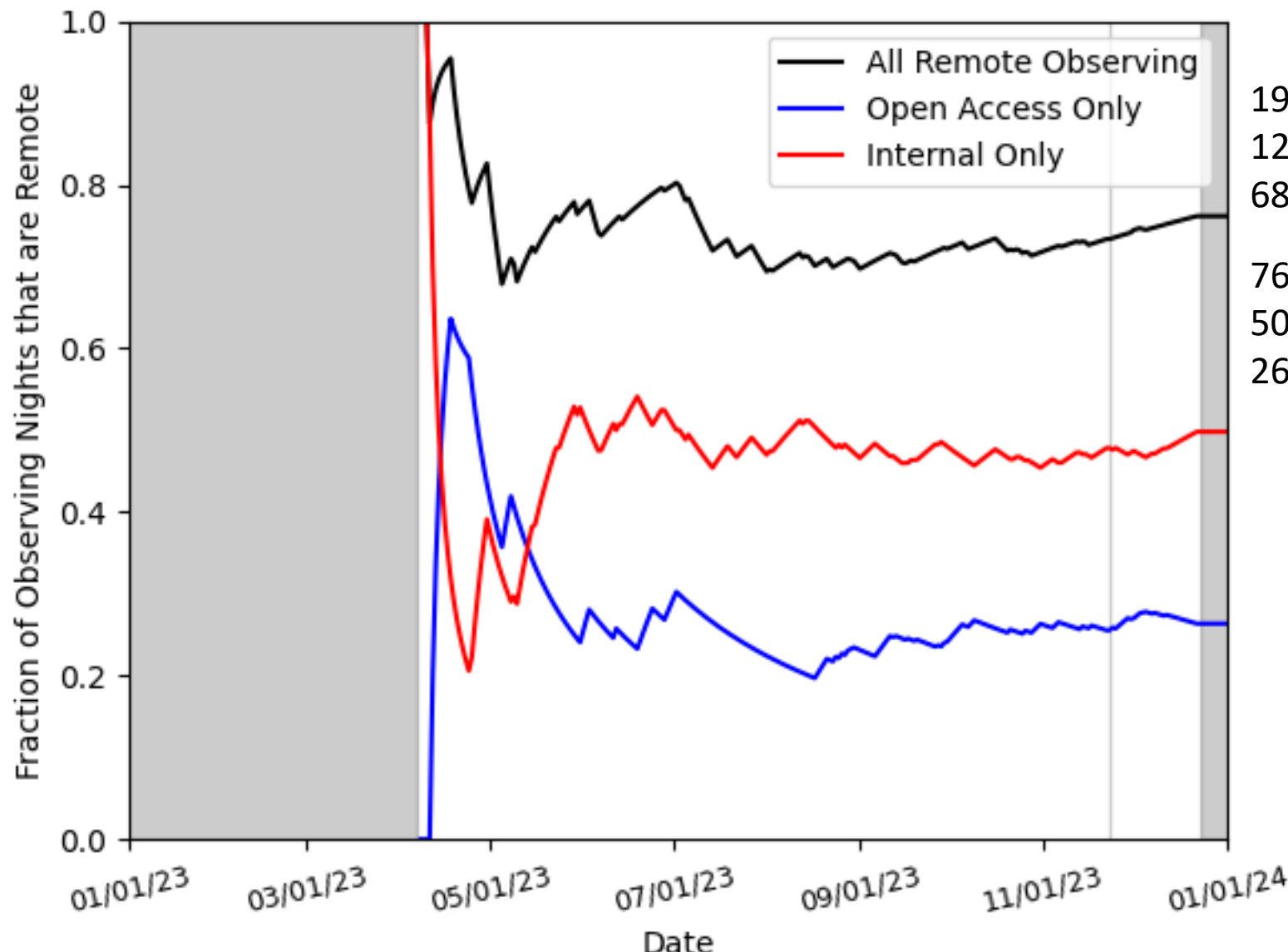


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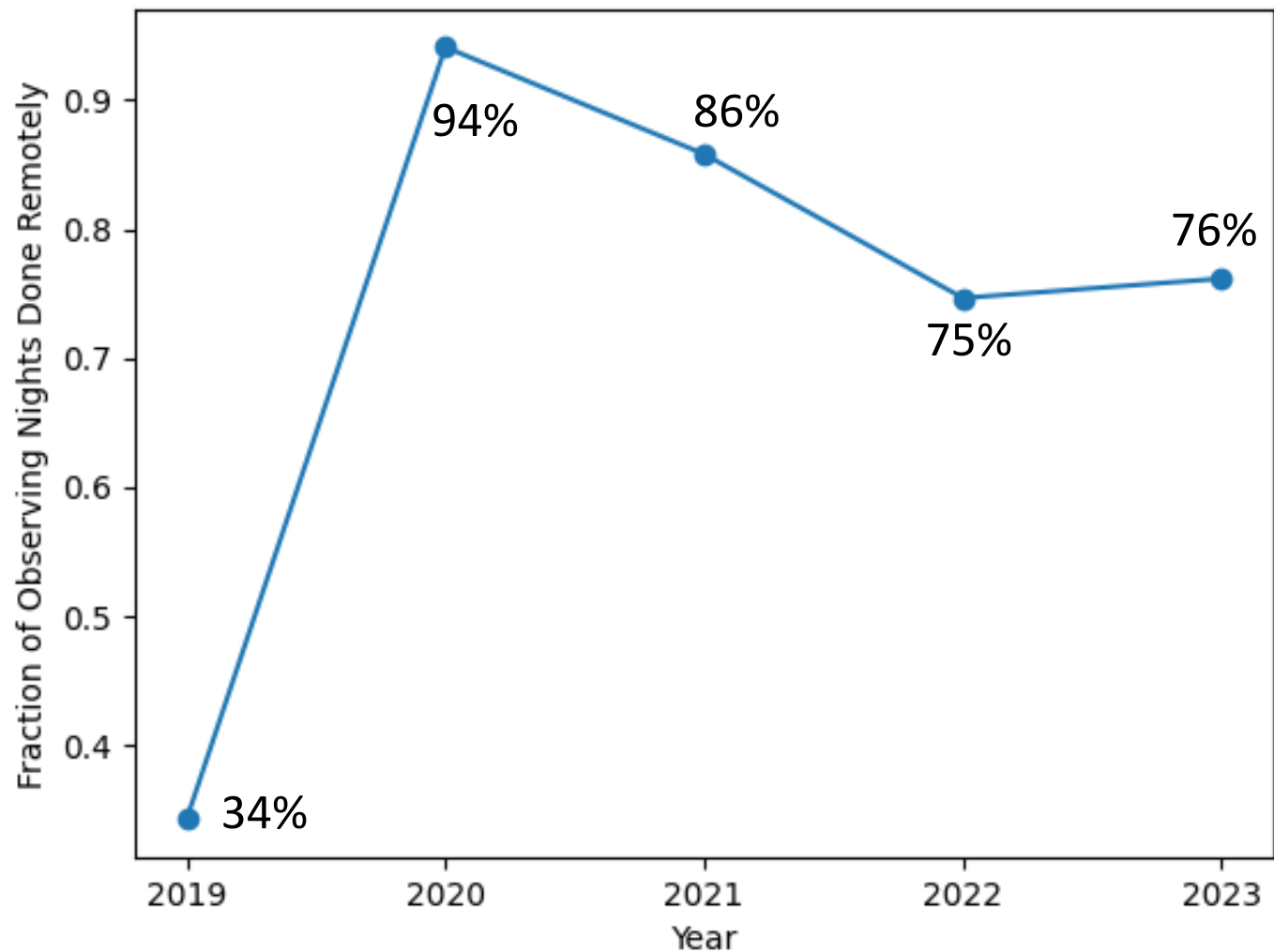
Remote Observing Stats (2023 Only)



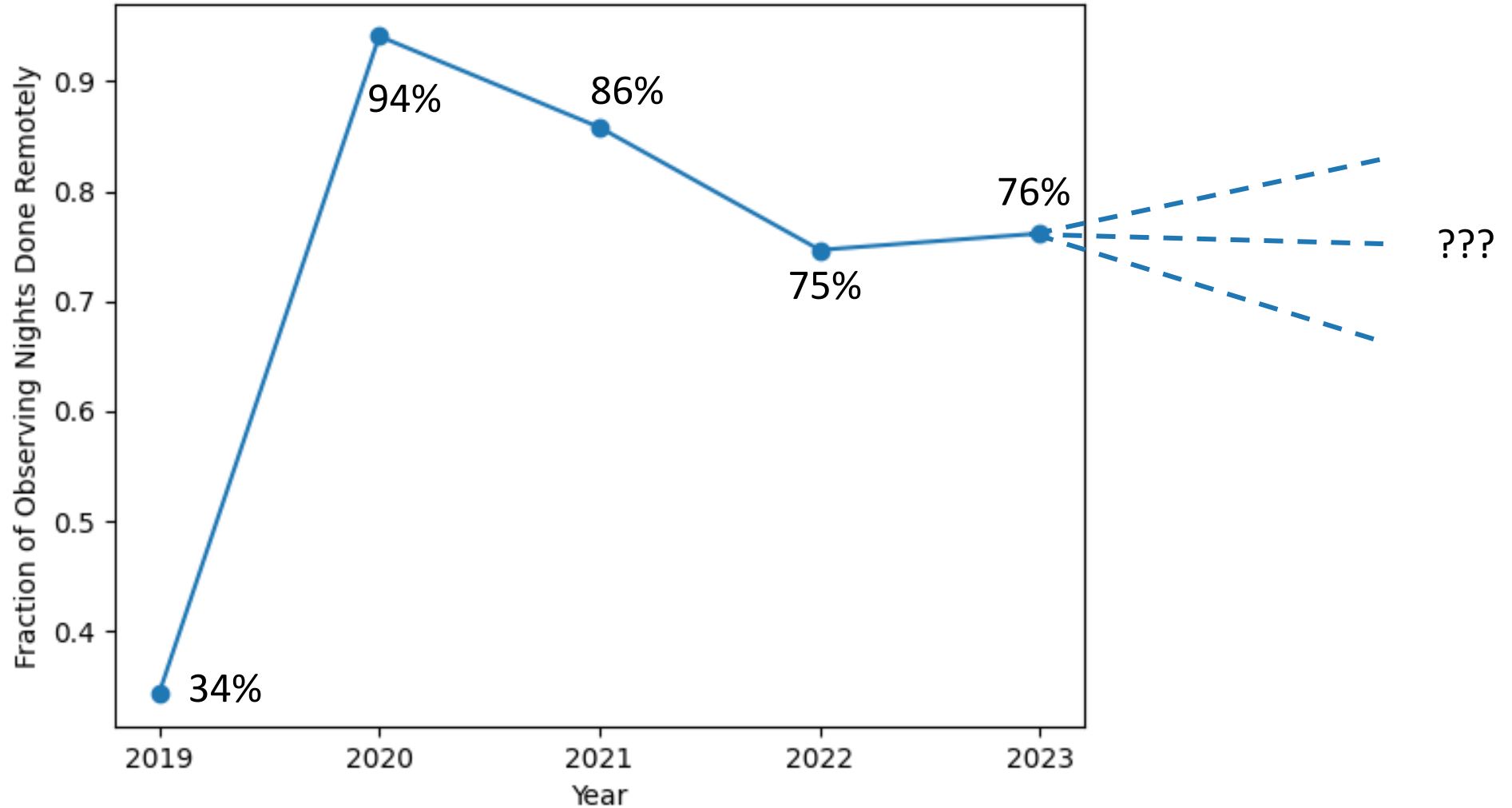
197 Remote Nights
 129 Internal
 68 Open Access

76% Remote Nights
 50% Internal+Remote
 26% Open Access+Remote

Remote Observing Stats (2019 – 2023)



Remote Observing Stats (2019 – 2023)



CHARA Discord Bot



- Reads logs from wavefront sensor and weather server
- Helpful notices at start/mid/end of night
- bot-spam channel
- Can print reports:
 - !seeing (R0 seeing in cm)
 - !rh (Relative Humidity)
 - !wind (Sustained & Gust)
 - !times (important times)

CHARA Array # bot-spam

1 hour average R0:
 E1: No recent wfs data
 E2: 7.80 cm (8:38 to 9:38 UT)
 S1: 8.23 cm (8:38 to 9:38 UT)
 S2: 8.92 cm (8:38 to 9:38 UT)
 W1: 10.80 cm (8:38 to 9:38 UT)
 W2: 4.30 cm (8:38 to 9:38 UT)

inoura 12/21/2022 6:14 AM
!seeing

CHARA-Bot BOT 12/21/2022 6:14 AM
Seeing report. Last updated: 11:14 UT

10 minute average R0:
 E1: 8.21 cm (11:04 to 11:14 UT)
 E2: 10.51 cm (11:04 to 11:13 UT)
 S1: 9.86 cm (11:04 to 11:13 UT)
 S2: 12.04 cm (11:04 to 11:14 UT)
 W1: 12.04 cm (11:04 to 11:13 UT)
 W2: 5.18 cm (11:04 to 11:14 UT)

1 hour average R0:
 E1: 8.49 cm (10:14 to 11:14 UT)
 E2: 10.11 cm (10:14 to 11:13 UT)
 S1: 9.79 cm (10:14 to 11:13 UT)
 S2: 12.01 cm (10:14 to 11:14 UT)
 W1: 12.08 cm (10:14 to 11:13 UT)
 W2: 5.09 cm (10:14 to 11:14 UT)

VOICE CHANNELS +

General

Nighttime Operations

inoura 12/21/2022 7:56 AM
!seeing

CHARA-Bot BOT 12/21/2022 7:56 AM
Seeing report. Last updated: 12:55 UT

December 19, 2022

Jeremy 12/19/2022 1:13 PM
!rh

CHARA-Bot BOT 12/19/2022 1:13 PM
Relative Humidity Report

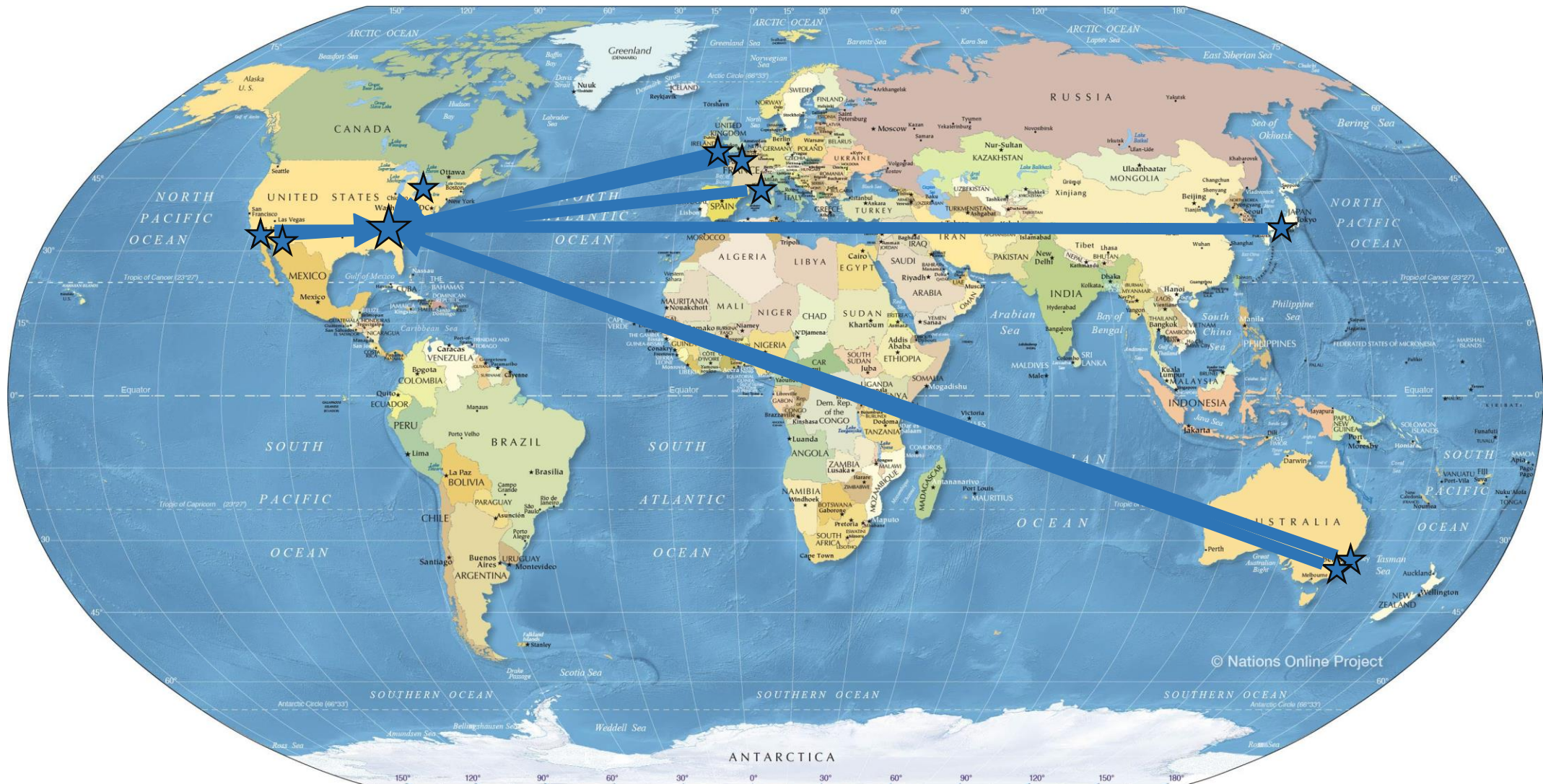
E1: 39.7% as of UT 18:11
 E2: 30.1% as of UT 18:12
 S1: 29.8% as of UT 18:11
 S2: 37.2% as of UT 18:12
 W1: 23.3% as of UT 18:12
 W2: 25.2% as of UT 18:11

Jeremy 12/19/2022 1:13 PM
!wind

CHARA-Bot BOT 12/19/2022 1:13 PM
Highest Wind Speeds in the last 10 minutes

E1: Wind - 12.5 km/h, Gusts - -1.0 km/h
 E2: Wind - 0.0 km/h, Gusts - 0.0 km/h
 S1: Wind - 6.7 km/h, Gusts - 7.3 km/h
 S2: Wind - 4.0 km/h, Gusts - 5.7 km/h
 W1: Wind - 0.0 km/h, Gusts - 11.2 km/h
 W2: Wind - 2.6 km/h, Gusts - -1.0 km/h

CHARA Atlanta Data Archive



© Nations Online Project



CHARA Data Policy

- All CHARA data are public EXCEPT:
 - New data (18-month proprietary period)
 - Student thesis data
 - Long-term survey data
- Data are accessible on the Remote Data Reduction Machine

The collage displays several key components of the CHARA data reduction pipeline:

- Star List:** A window titled "CHOOSE CALIBRATOR(S):" listing stars such as HD 27371, HD 27697, HD 28226, HD 28305, HD 28307, HD 28395, HD 28447, HD 48737, HD 52711, HD 67542, HD 8538, and HD 8929. Each entry includes a parallax value and uncertainty (e.g., HD 28226 [NOON CAL: UB 0,35 +/- 0,01 mas]).
- Elevation Plot:** A graph showing "Elevation (Deg)" on the y-axis (ranging from 20 to 80) against "UT Time (Hours)" on the x-axis (ranging from 2 to 14). The plot shows a series of peaks and troughs corresponding to different observations.
- vis2 Plot:** A plot titled "S2-S1 (Baseline 0) @ 1,82mic (Wavelength 17)" showing "Vis2" on the y-axis (ranging from 0.0 to 1.0) against "UT (hrs)" on the x-axis (ranging from 2 to 14). The plot features a red shaded region representing the data and a white line representing the fit. Vertical dashed lines indicate observation times for various stars.
- Terminal Window:** A terminal window showing the output of the CHARA software, including compiled modules like NINT, CALTABLES_VIS2_V2_FAST, MIRCX_SMARTGROUPS, and CALTABLES_VIS2_V2, and interactive prompts for the user.

CHARA Online Database Portal

database.chara-array.org

CHARA Database Query Form

Select a database:

- All CHARA
- Classic
- CLIMB 1
- CLIMB 2
- FLUOR
- JouFLU
- MIRC
- MIRC-X
- MYSTIC
- PAVO
- VEGA

Submit

CHARA Database Query Form

Star Name

Enter a target name in any format (e.g., Vega, alpha Lyr, HD 172167, etc.). The webapp will determine the coordinates of the target using a CDS search and will constrain the database to those coordinates.

Start Date

mm/dd/yyyy

End Date

mm/dd/yyyy

Search Distance (degrees)

0.50

The distance from the target star to constrain the database by.

Columns to Display:

Star_HD
Object_Type
UT_Date
UT_Time

Select Beam Combiner(s):

Classic
CLIMB 1
CLIMB 2
FLUOR

Select PI(s):

25
Anderson
Baines
Baron

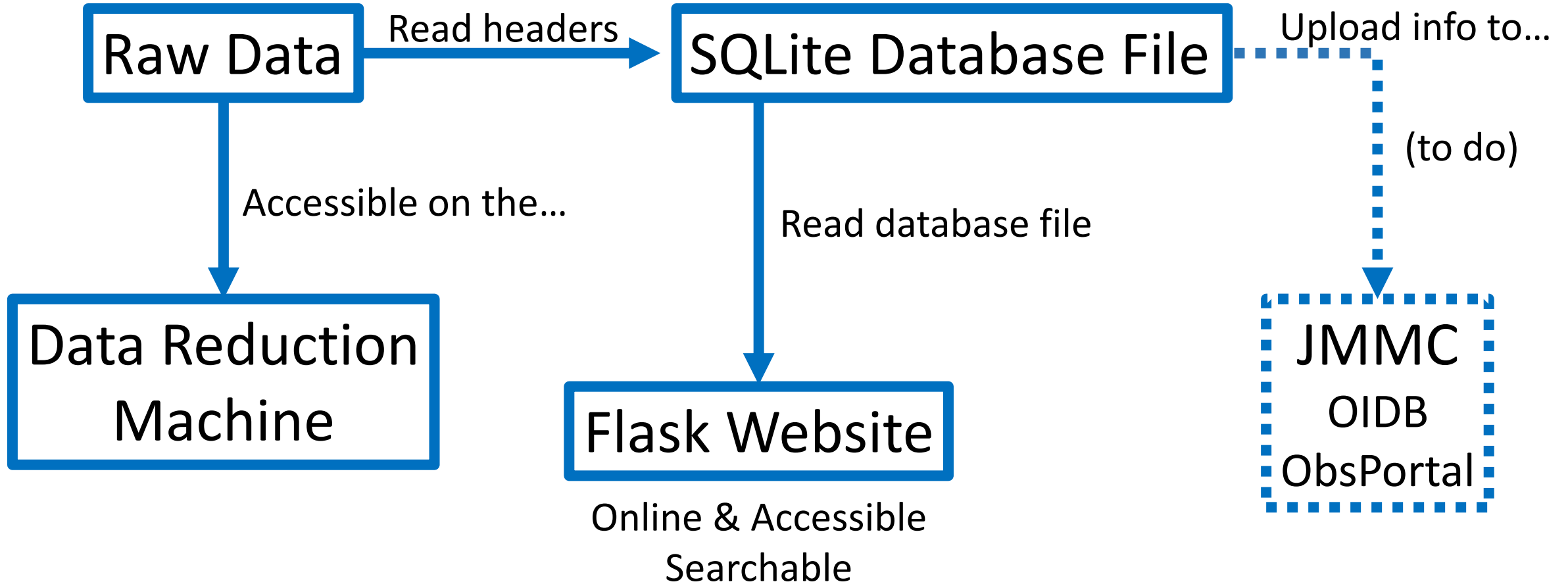
The Primary Investigator as listed in the data headers. NOTE: Sometimes misspellings of PI names occur or filler text is used on testing nights. Many observations do not have a listed PI.

Submit



CHARA Online Database Portal

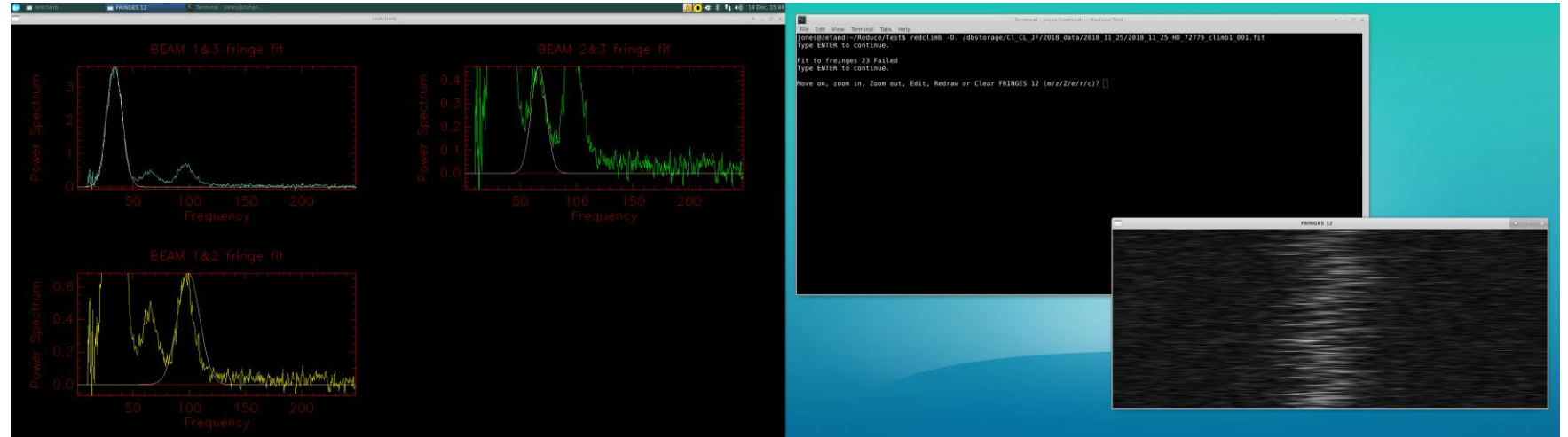
Stored on archive machine



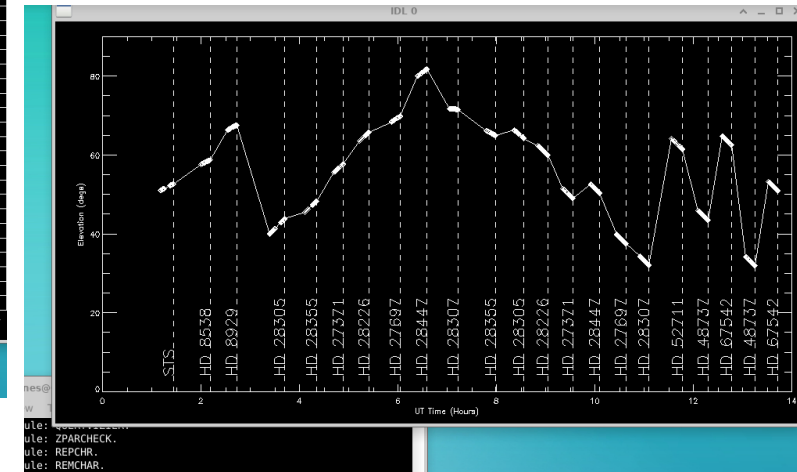
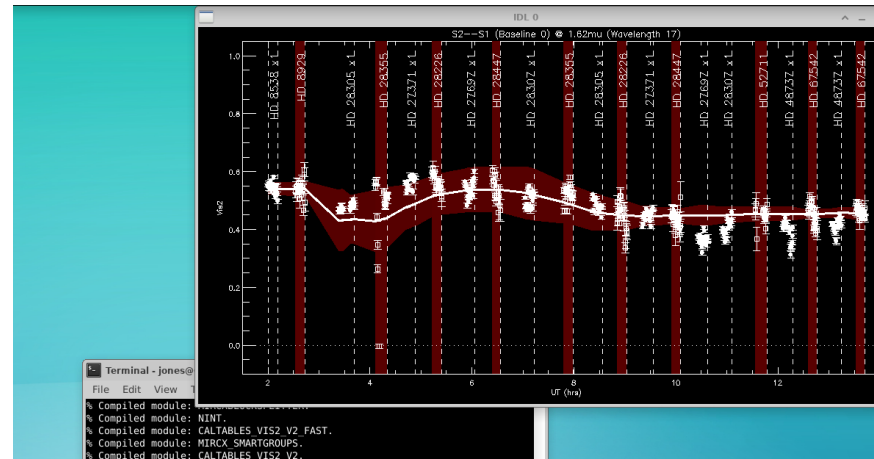


Remote Data Reduction

- Data Reduction Machine linked to archive
- Reduce data remotely
- Download final reduction
- **Benefits:**



- Reduction software always up to date
- No need to download raw data
- Cross-platform

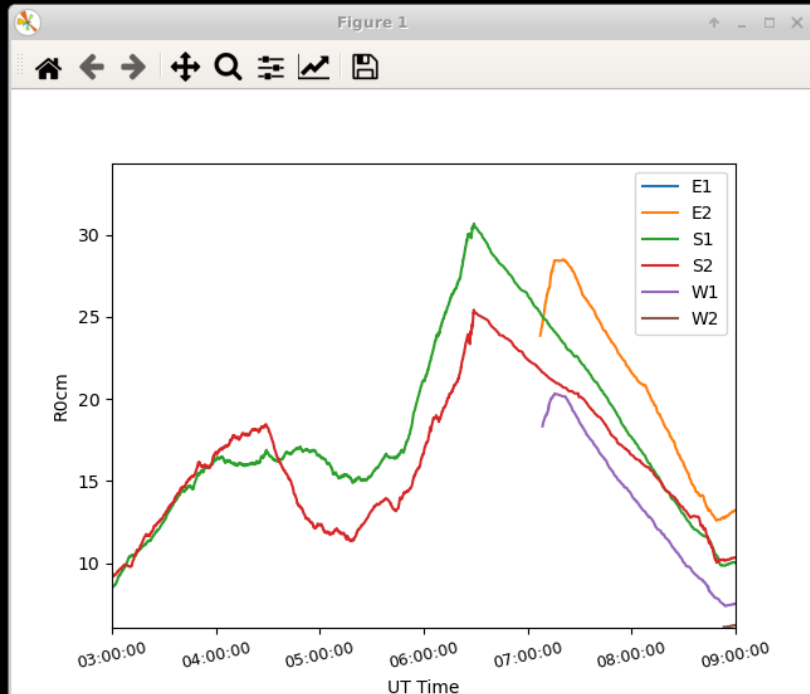




CHARA Seeing Reviewer

(it does more than just seeing!)

```
jones@Chara-Reduction:~$ source srenv
(srenv) jones@Chara-Reduction:~$ seeing_reviewer.py
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_E1_01.log (167 lines)
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_E2_01.log (1191 lines)
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_S1_01.log (2846 lines)
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_S2_01.log (2817 lines)
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_W1_01.log (1111 lines)
Reading /dbstorage/logfiles/2022/2022_03_19_wfs_W2_01.log (933 lines)
Seeing smoothed over 30 minutes
E1 | Mean R0cm: 18.50, Median R0cm: 9.80, St Dev: 21.06 cm
E2 | Mean R0cm: 16.31, Median R0cm: 13.30, St Dev: 10.21 cm
S1 | Mean R0cm: 15.29, Median R0cm: 12.70, St Dev: 8.91 cm
S2 | Mean R0cm: 14.87, Median R0cm: 12.00, St Dev: 11.36 cm
W1 | Mean R0cm: 11.93, Median R0cm: 9.10, St Dev: 7.80 cm
W2 | Mean R0cm: 16.08, Median R0cm: 7.10, St Dev: 25.74 cm
```



Seeing Reviewer

Your location (to determine where seeing reports are stored):

On the Mountain Data Reduction Machine Manually Select Directory

Choose the telescopes you wish to display:

E1 E2 S1 S2 W1 W2

Choose Length of Time to Average Seeing Over:

None 5 min 10 min 30 min 60 min

Enter or choose the date (format 2019 Jan 01):

2022 Mar 19

Enter time range in the format HH:MM (optional):

UT Start: 3:00 UT End: 9:00

Select an alternative feature to plot from the wfs logfile (R0 seeing default)

R0cm DETrms ZDR0 Eldg XTilt YTilt Focus Astig1 Astig2 Coma1 Coma2

